THE SCIENCE NEWS-LETTER

A Weekly Summary of Current Science

EDITED BY WATSON DAVIS

ISSUED BY
SCIENCE SERVICE
1115 Connecticut Avenue
WASHINGTON, D. C.

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SUBSCRIPTION: $5 A YEAR, POSTPAID

Vol. II, No. 116 Saturday, June 30, 1923

Dr. Edwin E. Slosson

CHATS ON SCIENCE

MOTION PICTURE OF ATOMIC COLLISIONS

Staging a collision between locomotives is an old movie stunt but Professor W. D. Harkins of the University of Chicago has gone to the opposite extreme in setting up a camera that will take pictures of the tracks of the atoms through space and their occasional collisions.

Since the atomic particle to be photographed is only about a million millionth of an inch in size and is moving at a speed of ten thousand miles a second, taking its picture is more of a feat than filming a slow-coach locomotive that may be making a mere sixty miles an hour. To work out a way to do it required an alliance of Anglo-Saxon and Japanese brains, the "Wilson-Shimizu apparatus", it is called. In this ingenious contrivance advantage is taken of the fact that when moist air is cooled suddenly the water is precipitated from the air in the form of dewdrops that deposit upon the walls of the vessel or upon any electrified particles, such as dust, that may be floating in the air.

Now the smallest of all possible electrical particles is that known as the electron, which is so minute that it would take 1840 of them to weigh as much as the smallest atom, the atom of hydrogen. These electrons are more or less loosely attached to the atoms of all kinds of matter; so loosely in fact that you can rub some of them off of a piece of glass with your handkerchief as is shown by the fact that you have "electrified" the glass.

We can get free electrons from air by knocking them off the atoms of nitrogen by bombarding them with what are known as "alpha particles". The alpha particles are the fragments of helium atoms thrown off when the metal radium decomposes. They carry a double charge of positive electricity and projected from the exploding radium atom at a speed some twenty thousand times as fast as a rifle bullet. Their momentum is so great that they plunge right through the atoms they encounter and may travel several inches through the air before they are slowed down, leaving behind a trail of some 200,000 fragments of nitrogen atoms. These fragments, being electrified may each form the center of a minute dewdrop. If now a bright light be thrown on the screen from the side, the track of the alpha particle will be seen as a shining line of illuminated drops, and may be photographed.

But once in a while the flying alpha will do more damage to an atom than carry off one of its outer electrons. It may chance to hit an atom in its central nucleus, where most of its mass is concentrated, and so smash it to pieces. Now the nucleus of a nitrogen atom is made up of hydrogen and helium and either of these may be dislodged. In Professor Harkins' snapshots we can see the result of such a collision. The alpha particle has bumped up against the nucleus of a nitrogen atom and bounded back, while the dislodged fragment of the nucleus is projected forward, so the track appears to fork.

If a comet driving through our solar system should carry off Neptune or Uranus nobody but the astronomers would miss it, but if the comet should hit the nucleus of our solar system and knock the sun to pieces we would all know it - or more likely we would not know anything. So in these atomic movies we are witnessing the death of an atom, the destruction of an element. Or to view the affair in a more optimistic light, we be hold the formation of new atoms from old ones. So the camera is now showing us something that was formerly not only invisible but thought to be impossible.

READING REFERENCES - Mills, John. Within the Atom. New York, D. Van Nostrand Company, 1922. Millikan, Robert Andrews. The Electron. Chicago, University of Chicago Press, 1917.

IODINE DROP MAKES WATER PURE WHILE YOU WAIT

During your vacation this year, don't feel that you have to get typhoid fever because you may have to drink from a polluted stream! It is not stylish any more. The Army Medical School has perfected a rapid and easy way of purifying drinking water while you wait. Here's how:

Hold your quart thermos bottle in one hand and fill it with water. Add one drop - two will do no damage - of tincture of iodine, the ordinary 7% kind that you buy at the corner drug store. Shake the water up a bit and that's all! In twenty or thirty minutes all the harmful bacteria that are likely to be there will be killed, says Major A. P. Hitchens of the Medical Corps. The amount of iodine added is too slight to even taste.

Bacteriologists used to think that all the bacteria in water had to be killed before it would be fit to drink, or "potable" as our waterworks friends say, he explained today. It has however been found that it is seldom that any harmful bacteria will be present that cannot be rather easily destroyed. The greatest danger in drinking water of unknown purity is from diseases, of the typhoid fever and cholera group, that are caused by non-spore-forming organisms and can be easily killed as compared to many entirely harmless bacteria. It is for this reason that the simple iodine treatment is so effective.

READING REFERENCES - Hoskins, John Kurtz. Factors governing the selection and protection of sources of water supply, by J. K. Hoskins, associate sanitary engineer, U.S. Public Health Service, Washington, Government Printing Office, 1921. Johnson, George A. The purification of public water supplies. Washington, Government Printing Office, 1923.

PROHIBITION REGULATIONS SUBMITTED TO CHEMISTS

Revised Regulations No. 60, covering the whole subject of the traffic in alcohol and intoxicating liquor under the Volstead Act, have been submitted by the Commissioner of Internal Revenue to the recently organized Alcohol Trade Advisory Committee for comment and suggestion. The regulations will probably be finally promulgated in midsummer. This is the first step toward active co-operation between the chemical industry and the government toward working out a system whereby lawbreakers may be apprehended and industry protected.

Dr. H. E. Howe, secretary of the committee and editor of the Journal of Industrial and Engineering Chemistry, is sending the proofs of the regulations to his colleagues and a report by the committee is expected by July 1.

The advisory committee was appointed by D. H. Blair, Commissioner of Internal Revenue, for the purpose of securing the cooperation of the American Chemical Society in the enforcement of the law, having regard for the proper development of the many industries using alcohol. William A. Sailer of Baltimore, president of the American Drug Manufacturers Association is chairman.

The other members are: W. J. Schieffelin, New York, representing the National Wholesale Druggists' Association; Martin H. Ittner, Jersey City, representing the American Manufacturers of Toilet Articles; Frank A. Blair, New York, president of the Proprietary Association; R. H. Bond, Baltimore, of the Flavoring Extract Manufacturers' Association; M. C. Whitaker, New York, president of the U. S. Industrial Chemical Company; Charles L. Reese, Wilmington, President of the Manufacturing Chemists' Association; R. M. Kane, Indianapolis, president of the American Pharmaceutical Manufacturers' Association; H. E. Howe; Samuel C. Henry, Chicago, National Association of Retail Druggists; and Dr. J. H. Beal, American Pharmaceutical Association.

The committee recently met with Commissioner Blair who emphasized the desire and intention of government officials to administer the law so that the rights of all the people might be properly guarded. Members of the committee expressed keen satisfaction at this step on the part of the commissioner so that there might be fewer mistakes in the enforcement of the law, as chemical industry is dependent upon a proper use of non-beverage alcohol.

BRIGHT METEORS ARE NO BIGGER THAN SHOT

That meteors as bright as the brightest star are no bigger than small bird-shot is a conclusion drawn by Prof. F. M. Lindeman and Mr. C. M. Dobson, authors of a recent article in the Proceedings of the Royal Society. A meteor as bright as the moon would, they find, be only an inch in diameter and would weigh about two ounces.

As a result of their study, the authors conclude that the temperature of the upper atmosphere is much higher than was formerly supposed. It has long been known that the fall of temperature with altitude continues only to a height of about seven miles where the temperature is as low as from 60 to 70 degrees below zero Fahrenheit. But from this altitude as high as "sounding balloons"

have gone, which is about 15 miles, the temperature has remained about the same. This is what is known as the stratosphere or isothermal layer.

The recent investigators of meteors now conclude that this layer of fairly constant temperature extends up to a height of 30 miles, above which the temperature again rises, so that at altitudes of from 30 to 50 miles it reaches considerably above the freezing point, or about the average temperature at the earth's surface.

The density of the air at a height of 60 miles is calculated to be one-millionth of that at the surface. It is thought to be composed largely of ozone and its high temperature is thought to be due to heating by the long wave length heat waves from the surface of the earth.

HOT FOOD TABOOED, INDIAN TEETH TELL

Remarkable preservation of teeth in one of the skulls recently taken from the Albany, Ore., mounds by University of Oregon geologists has led Dr. Edwin T. Hodge, professor of geology, to express his belief that the aborigines interred in the cemetery of the ancients on the banks of the Santiam River were not eaters of warm foodstuffs. The molars in the jawbone examined by Dr. Hodge, who has recently made a detailed study of the ancient men of Oregon, are worn very low, indicating that the remains are those of an aged human, but no traces of decay are visible.

Dr. Hodge has the opinion of dental experts to the effect that hot foodstuffs have a deteriorating reaction on the teeth of man. According to the geologist, it is a well-known fact that Indians found in America by early explorers had teeth remarkably preserved. It is probable, believes Dr. Hodge, that the aborigines of the Albany mounds used fire in the preparation of food, but since all the cooking was done in the open, the roughly prepared food cooled off before being eaten.

Close examination of the teeth in the Albany skulls reveals that the enamel edges are not jagged; a fact, in the opinion of Dr. Hodge, which indicated that the early man of Oregon was careful to exclude gritty material from his dinner-dish.

ALIENIST ADVOCATES BIRTH CONTROL OF UNFIT

Birth control was declared to be "the first logical method for the prevention of criminality" by Dr. Harold I. Gosline, clinical director of the Rhode Island State Hospital for Mental Diseases, who addressed members of the Eugenics Research Association at their annual meeting at Cold Spring Harbor recently. He also said it was not an unreasonable measure to advocate birth control for persons suffering from physical maladies such as heart disease with its accompanying nervousness, occasional mental breakdowns and almost certain economic inefficiency. Such a program, he said, should be supported alike on the ground of good health and good morals, and he had no doubt would be supported by men of all religious beliefs.

"It does not matter that the relationship between mental and physical has not been proven", he said. "It does not matter that the transmission of mental disease has not been demonstrated. Whether you give heredity or environment your preference it is not an unreasonable thing to advocate birth control for the mentally afflicted.

"So we might develop the subject of birth control for the socially unfit. The criminal is such an individual. It is not an unreasonable thing to advocate birth control for the criminal and for the family of the criminal."

Dr. Gosline said that he realized a long campaign of popular education would be necessary before such feelings would be translated into action by the great mass of the people, and that it would fail, he feared, if it became a "high brow" effort to "uplift". Continuing, he said:

"I wish I might take the time necessary to outline some of the probable results of scientifically administered birth control. Suffice to say that I believe a new race will arise when it is understood and practiced. I believe that we can largely prevent the presence of the criminal in American society."

READING REFERENCES- Popenoe, Paul and Johnson, R. H. Applied Eugenics, New York, MacMillan Company, 1920. Marchant, James. The Control of Parenthood, by Professor J. Arthur Thomson, Professor Leonard Hill, and others. New York, G. P. Putnam's Sons, 1920.

REPRODUCTION OF UNFIT PERILS ALL SAYS JUDGE

Declaring the reproduction of moral and mental defectives to be one of the greatest menaces to civilization, Chief Justice Harry Olson of the Municipal Court of Chicago, president of the Eugenics Research Association, made a notable plea at its annual meeting at Cold Spring Harbor recently for the segregation on farm colonies of all classes of defectives. Unless some such method is taken to reverse what he termed the present encouragement of the reproduction of defectives, our race is in danger of committing suicide by degeneration, he said.

After a review of statistics which showed that most criminals or persons arraigned before the Boys Court, the Morals Court, and the Domestic Relations Court of Chicago were definitely subnormal mentally or morally, Judge Olson said in part:

"Persons of stunted intellect and moral defects are scattered all through society. They account for the greatest burden of educators, from the kindergarten to the university. They account for many of the wife desertions, the bizarre and often cruel domestic entanglements, and the divorces. They account for the carelessness, the irresponsibility, and the quarrelsomeness, which checks industrial production. They account for some of the needless civil litigation and for much of the lying of witnesses.

"Irresponsibility is the quintessential unsocial characteristic of both general classes of defectives, the morons and the psychopaths. The competent members of the community have to guard these defectives, endure their depredations and make good their waste - often doing all these things without being fully aware of the burden or the cause for it.

"Now, what is the great menace from irresponsibility at the present time? Obviously it is the easy reproduction of the unfit. The majority of competent men and women are putting rigid limitation upon the number of the offspring. It is the natural reaction of their sense of responsibility. The defectives have as much instinct for reproduction as normals, some of them much more. They lack the innate inhibitions against easy and rapid reproduction.

"And what has society done in the face of this threatening situation? Has it made it difficult or impossible for defectives to propagate?

"On the contrary, society has devoted itself with frenzied zeal to encourage the propagation of the unfit. It does this in both indirect and direct ways; indirect by placing no bar to the union of the unfit, or the union of unfit with the fit; direct, by exerting itself in every conceivable way that nature and science can suggest to keep alive every child born to the unfit and to feed and develop every such child until he or she is old enough to reproduce (excepting, of course, the imbecile and the idiot).

"There have always been defectives and defective stocks, but until quite recently the environment of northern peoples was so harsh and rigorous that the defective stocks tended constantly to be uprooted, to be bred out. The defectives had much the higher mortality rate, especially among infants. Now we find the ordinary conditions of a century ago, to go no farther back, absolutely reversed.

"Of course nature will supply in time a corrective, if we are not clever enough to restore the equilibrium by conscious action. But nature's cure will mean a loss of what we call civilization as the route to the old conditions of privation and rigorous living. When neither normal or defective has any hospital or asylum, but both must shift for themselves in a relentless struggle with natural forces, as was our history through countless ages, the unfit will again diminish and the fit be restored to their rightful ascendency.

"It may be that this is the only way. Some of the alternatives are frankly unthinkable. We cannot deliberately reproduce the hardships of life which our forefathers fought and subdued. We cannot withdraw from the unfit the benefit of medical and surgical aid.

"We cannot do what our ancestors did at a not remote period, put to death every incorrigible criminal. That would help us out to a considerable extent, but it is impossible. We cannot deport our undesirable stocks. We have not been able thus far to keep other countries from unloading on us. We cannot unsex all our defectives. That would be the easiest, the cheapest and the surest method. It would purify the life stream in a few years. But public opinion will not at this time sustain such practices on a scale commensurate with the need.

"There remains seemingly but one alternative, which is to segregate the defective delinquents in state controlled colonies where the protective environment which they need can be created. Under such control there is an abrupt end

to criminal depredations and to reproduction. Both great needs of society are met. The need of the individual defective is likewise met, for he is given an opportunity to live to the limit of his powers, whatever that limit may be in each individual case. He will have all his worries and troubles removed, existence will no longer be anguish and agony for him, but a sensible balancing of work and play.

"The greatest limitation today upon immediate entry upon such a programme is not the lack of public understanding or the inertia of legislatures, but the inability to produce on short notice the psychopathic experts who are qualified to sort out and classify the subnormals. It will take some time to provide the teaching staffs and to turn out such experts. There will be no lack of public opinion by the time the new type of psychological alienist is provided in sufficient numbers.

"A common understanding of the situation, I believe, will bring to the cause of eugenics the fervor that inspires religion. Let us reverse the Chinese custom of revering ancestors; let us improve and idealize our posterity."

READING REFERENCES- Conklin, E. G., Heridity and Environment, Princeton, Princeton University Press, 1922. Newman, Horatio Hackett, Readings in Evolution, Genetics, and Eugenics, Chicago, University of Chicago Press, 1921. Thomson, J. Arthur, The Control of Life, New York, H. Holt and Company, 1921.

RADIO FANS PLAN SIGNALS TO NORTH MAGNETIC POLE

Radio amateurs are preparing to listen in on the North Pole. A schedule for communication with the MacMillan Arctic expedition has been arranged by F. H. Schnell, traffic manager of the American Radio Relay League, and amateurs all over the country are showing great interest. The expedition was expected to leave Wiscasset, Me., June 23 on board MacMillan's schooner, "Bowdoin".

Amateurs are being depended upon to listen for messages from Donald H. Mix, radio operator of the expedition, not only during the early stages of the journey but also after arrival at winter quarters at Flagler Bay, near Cape Sabine, 450 miles northeast of the north magnetic pole. The vessel's call is WNP and messages will be sent out on wave lengths of 180, 220, and 300 meters, most of the work being expected to be done on 220 meters.

According to Schnell's schedule, WNP's regular operating time will be between 1 a.m. and 7 a.m. Eastern Standard Time; from 1 a.m. to 2:59 a.m., Mix will communicate with amateurs; from 3 a.m. to 4:59 a.m., provided two way communication is not possible, WNP will attempt to work stations with limited commercial licenses and from 5 a.m. to 7 a.m. will again try amateurs. Late in the evening from 10 p.m. to midnight, WNP will stand by for press reports from Arlington, and at midnight for reports from the naval station NSS. The latter station will be employed to report results of WNP's transmission.

Never since the transatlantic tests has amateur interest been so high and hundreds of "hams" are tuning up their sets, lifting their antennae another

notch or two to assure their chances of keeping in contact with their friend Mix of 1TS. The amateur whose signals have been heard in Europe as well as across the Pacific, has his heart set on reaching the Pole this winter without figuring the cost.

ONLY ONE IN TEN PATIENTS NEED HOSPITAL TREATMENT

That 80 to 90 per cent of all cases of illness can be treated successfully by general practitioners, and that 90 per cent of all patients can be cared for efficiently in their own homes or in physicians' offices without the need of a hospital, was the opinion expressed by the Council on Medical Education and Hospitals of the American Meeical Association in a report to the House of Delegates meeting in San Francisco recently. The meeting was the first of the annual convention of the Association.

The Council further suggested that modern medical knowledge and practice can be furnished to even rural communities if the citizens of such communities will guarantee the physician an income of $2,500 or more each year for a term of five years. It was stated that the number of hospital beds in the country has greatly increased in recent years so that there are now about 6,570 hospitals, sanitoriums, and homes in the United States. There are also listed 3,294 dispensaries and clinics which care for approximately eight million patients a year.

The average age of medical school graduates is now 26.8 years, owing to the lengthening of the courses of study in most colleges and schools, the Council reported. Indications are that the number of medical graduates will be increased during the next five years by about 900 a year, reaching 4,500 in 1925.

A ruling of the Federal prohibition authorities preventing a firm of pharmaceutical chemists from securing large quantities of alcohol on the grounds that it did not sell patent or proprietary medicines was called to the attention of the delegates by the Bureau of Legal Medicine and Legislation. An effort is being made to find the basis for the action by the prohibition commissioner. Efforts have been made to reduce the tax on physicians under the Harrison anti-narcotic act, and to secure advance notice of narcotic regulations so that they may be discussed before being made effective.

Dr. Olin West, secretary of the association, reported a present membership of 88,519 physicians out of approximately 150,000 practicing in the United States.

ENVIRONMENT, NOT HEREDITY, CHIEF CAUSE OF INSANITY

Environment has so much to do with the causation of mental disease that the control of heredity through segregation or sterilization of mental defectives should not be considered the only hope of solving the social problem of mental deficiency, Dr. Abraham Myerson of Boston told members of the American Psychiatric Association in their annual meeting at Detroit recently.

Much evidence has been accumulated to show that the germ plasm of individua which bears the inherited traits from one generation to another, may be altered by environment, Dr. Myerson said. The most fruitful working hypothesis for students of mental disease is therefore to regard the environment as responsible and to undertake research in that direction rather than to take refuge in any hypothetical unit character defect or alteration. Investigation must be carried on by studies of patients themselves and by laboratory methods, and not by merely statistical studies of heredity.

COUNTRY NEEDS RYE SAYS U. S. AGRICULTURE EXPERTS

There is need for more rye in this country. This statement, put out by the Department of Agriculture, is not meant in the sense in which it might be taken by a thirsty fraction of the population, but is an appeal to the farmers to raise more of the grain from which the contraband beverage gets its name.

Rye is the one grain which in composition more nearly approaches wheat than any other, and according to Department scientists it will in many localities give better yields and more food to the acre than wheat. There are parts of the country where no bread grain is now being grown and where wheat will not succeed, but where rye might be grown with success. This is especially true in the southern portions of the cotton belt, where the sandy soil and climatic conditions are unsuited for wheat.

Rye is one of the principal bread grains in Europe, furnishing the staple food of millions. It may be grown just as easily in this country, and might furnish an additional food supply where the growing of the more highly-prized wheat is impossible.

NO MOTHER-IN-LAW JOKES AMONG WINNEBAGO INDIANS

The mother-in-law problem did not present any great domestic difficulties to the Winnebago Indians, according to a monograph on the tribe by Dr. Paul Radin of the University of California, just issued by the U. S. Bureau of American Ethnology.

No Winnebago in former times was permitted to even look at his mother-in-law, much less to speak directly to her, and accidental meetings along the road were the cause of much embarrassment on both sides. The same taboo was in effect between fathers and daughters-in-law. It was considered a great offense to joke with these relatives, although such informal relations with one's brothers-in-law and sisters-in-law was permitted or even in some cases obligatory.

Because of unsuccessful fishing off French coasts, French fishing interests are developing a fleet of fast steam vessels to bring fresh cod caught off the coast of Iceland to the French market.

TABLOID BOOK REVIEWS

THE DAYS OF A MAN, being the memoirs of a naturalist, teacher and minor prophet of democracy. By David Starr Jordan, two vols. ills. World Book Company, Yonkers-on-Hudson.

Dr. Jordan, famous zoologist, university president, and publicist, has chosen an admirable title for his autobiographical book recently issued in excellent typographical form, interestingly and abundantly illustrated and well-bound. For the matter of the book is a running chronological account of the full days of a man who has done many important things well. Dr. Jordan is now seventy and still going strong. But it is a good thing that he has written, at seventy, his autobiography, for no biographer could possibly make so interesting a book about him as he has made himself.

Dr. Jordan's fine literary ability and his quaint humor make the book delightful as well as informing and inspiring reading. It tells for the first time in any adequate way the picturesque story of the founding and early development of Stanford University, of which he was the first president. Out of this story stands a clear picture of a wonderful woman and a woman's high faith and indomitable will, for it was on Mrs. Stanford that fell the great responsibility, after her husband's death, of keeping Stanford University alive in the face of obstacles that must often have seemed insuperable to both the founder and the president of the institution.

Dr. Jordan tells something of Herbert Hoover's college days, for this great apostle of American humanity and efficiency was a member of Stanford University's first class. Many other prominent men and women figure interestingly in Dr. Jordan's book, for his acquaintanceship with the leaders of thought and activity in America, Europe and Japan was wide and catholic. His influence on education and science in America has been very large and his thorough-going internationalism and strong advocacy of ways to international peace have made him an international figure. Altogether he has been for the last third of a century one of America's foremost men.

The "Days of a Man" is a good book for youth to read, and a good book for men and women, eager to help in the progress of humanity but occasionally discouraged by their hard contacts with the inertia and sordidness of life, to have conveniently at hand from which to draw new encouragement and determination.

V.K.

The ancients kept great numbers of rat-eating snakes in specially constructed pits in their medical temples and sent them to be liberated wherever the plague had broken out.

Guatemala has prohibited the importation of empty used bags in order to prevent the introduction of a grain moth which is very harmful to the coffee bean.
